Existence of the Solution in the Large for Caputo Fractional Reaction Diffusion Equation by Picard's Method

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Abstract

We have developed Picard's iterative method to prove the existence and uniqueness of the solution of the nonlinear Caputo fractional reaction diffusion equation in one dimensional space. The order of the fractional time derivative q is such that $0.5 \leq q \leq 1$. The existence result has been proved by a priori assuming the solution is bounded. Thus, we refer to this method as existence of solution in the large. The method can be extended to the Caputo fractional reaction diffusion system also.